In the animals which had lived from thirty-six to seventy-six days after operation, the dorsal roots, at their entrance into the cord, showed, on the same side, slight degeneration, which, however, could not be followed further into the dorsal horn.

On comparison, it was found that these appearances were confined to that region in the cord which was directly associated with the lost limb. Comparing, now, the conditions in man, the author examined eight spinal cords in individuals who had suffered amputation from three weeks to three years before their death.

In this material, the signs of degeneration so evident in the Guinea-pigs, were not present.

In comparing the two sets of results, it must be remembered that the Guinea-pigs were all of them young, and that these degenerative changes occur most easily in very young animals; that in the human material, the youngest individual was a boy of sixteen years, who had been amputated a year before, and whose case was complicated. Of course, the evidence would be more satisfactory if some of the Guinea-pigs had been allowed to live for a longer time, in order to determine the final outcome of the changes following the amputation; and, also, if the possible initial disturbance occurring in man could have been tested on more cords at periods from three to six weeks after amputation. If we may infer from these data the changes in the spinal cord in old amputations are probably due to an atrophy following disuse, it remains for the pathologists to determine whether or no this is a slow form of the same process which is designated as degeneration in Guinea-pigs.

"Studies on the Structure of the Chromatin in the Sympathetic Ganglion Cell."

Dr. F. Vas (Archiv. fur Mikroscopisches Anatomie, B. 40, H. 3, October 18, 1892).

When pathological changes are to be studied in a group of cells, their normal condition must be taken as the point of departure, and it naturally is to be asked whether this normal condition is a constant one.

Pathologists in general would be the first to admit that this question had not been answered with all the care that its importance demands. It is perfectly plain, that in the nervous system of man, the condition of the cells designated as normal depends upon the age of the individual, and the degree to which the cells had been stimulated just before death, and on the cause of death; and it is a safe prediction, also, that in the future modifications, due to sex and race, will be recognized. Although, therefore, the normal condition of nerve cells is variable, the detailed study of their variations has heretofore been but superficially considered.

As a sign of awakening attention to this matter, our author's study is important. The sympathetic nerve cells of the rabbit, dog and man, are studied by him according to the method of Nissl. This method consists in first hardening the specimen in absolute alcohol, imbedding in Colloidin and staining with Magenta.

It is valuable, from the fact that the cell undergoes comparatively little distortion, and that the chromatic substance in the cytoplasm is especially colored. For the study of the nucleus there are better methods. The results are shown in eight very good figures. In the first place, we see very clearly the differences in arrangement of the chromatic substance in the cells from the several animals examined; particularly noticeable is the wide variation in the relative development of the nucleus. The next five figures represent sympathetic cells from man at the following ages: the seventh month of fœtal life; at birth; at twelve years; at twenty-eight years, and at seventy years.

In the first mentioned, the cytoplasm is scanty and chromatin does not appear in it, while it does appear in the nucleus. As age advances up to twenty-eight years, three things happen: both cytoplasm and nuclei grow larger, the former growing more rapidly; the cytoplasm becomes more and more filled with chromatic substance, and from birth on, pigment appears and continues to increase in quantity.

The chromatin gradually disappears from the nuclei. In the individual at seventy years, evident changes of a regressive nature have taken place, both cytoplasm and nuclei have shrunken, and the former has lost considerable proportion of its chromatic substance.

These facts, so far as they relate to growth of sympathetic cells, are used by the author to controvert the views of Hale White, who, several years ago. on the basis of the study of sympathetic cells in animals and man, concluded that in monkeys and in man, and especially in man, cells of the sympathetic system were in a state of pigmentary degeneration. That the pigment increases, there can be no doubt, but that these cells are therefore to be considered degenerate, is not, however, a valid inference. Finally, the author has studied the effects of stimulation of these cells by applying the faradic current to the sympathetic cord, at some distance from the ganglion, and thus stimulating it continuously for fifteen minutes.

The experiments, six in number, were made on rabbits. During the process the ganglion was seen to become turgid; on examination by Nissl's method, the cells were found swollen, both nucleus and cytoplasm being enlarged.

The chromatin was displaced towards the periphery of the cell, the central portion of which was occupied by a homogeneous substance, free from chromatin. The nuclei also were displaced towards the periphery and partially extruded. Enlargement of the nuclei has been observed in the motor-cells of the spinal cord by Korybutt-Daskievits, as the result of stimulating the mixed nerve in a frog.

Hodge, on the contrary, found in his study of the spinal ganglion, a general shrinkage of the cells, and their nuclei. It is plain, therefore, that these gentlemen agree in finding a change as the result of stimulation, but they differ decidedly as to the character of the change described; and the difference can only be cleared up by the use of identical methods of stimulation and histological investigation on the various groups of cells involved. It should be pointed out, however, that in the case of the work of Hodge, the artificial stimuli were passed in the physiological direction; while in the case of Korybutt-Daskievits they were reverse to the physiological direction, and in the experiments of Vas, the direction in which they passed is, perhaps, doubtful. Further, that the changes which Hodge observed as the result of artificial stimulation, were similar to those observed in animals fatigued by their natural activity. The matter should certainly be further investigated.